Long-Term Course of Treatment-Seeking Vietnam Veterans with Posttraumatic Stress Disorder: Mortality, Clinical Condition, and Life Satisfaction

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Abstract: This study is a 6-year longitudinal study of 51 treatment-seeking male veterans with combat-related posttraumatic stress disorder. Measures of PTSD and psychiatric symptomatology, social functioning, and program impact were assessed at admission to an inpatient treatment program, at 18 months, and 6 years later. Previous studies had shown that the treatment program's impact on course of illness had been negligible. The sample showed an extremely high mortality rate of 17% over 6 years. The remaining veterans showed improvement in violence and alcohol and drug use, but an increase in hyperarousal symptoms and social isolation. Nearly three-fourths had had an inpatient hospitalization. Veterans' self-ratings, in contrast, indicated significant improvement in all areas of functioning except employment, as well as an overall positive view of the impact of the program on their lives. Results indicate that the majority of the veteran sample had experienced some improvement in their ability to cope with their chronic illness, decreasing their use of violence and substance abuse but still were experiencing high levels of symptomatology. The extremely high mortality rate, however, provides a somber reminder of the seriousness of this disorder.

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Opportunities to study the long-term course of combat-related posttraumatic stress disorder have only been possible in recent times due to the empirical specification of the disorder, establishment of treatment programs, and the existence of sizable cohorts of veterans (*e.g.*, from the Vietnam war). To date, very little is known about the long-term course of the disorder. A number of studies on World War II veterans clearly suggest the chronic nature of at least some symptom clusters over decades (Kluznik et al., 1986; Speed et al., 1989). The absence of specialized treatment programs for this earlier generation of veterans left open the question of the impact of treatment on the otherwise chronic course of the illness. Answers to this question are now within reach.

Treatment Effects

The treatment of combat-related posttraumatic stress disorder received its most intense effort through the comprehensive national program developed by the Department of Veterans Affairs from 1978 to the present. Stimulated initially by the needs of Vietnam veterans, these inpatient and outpatient programs attempted to provide the most comprehensive multidisciplinary treatment available (Arnold, 1985; Department of Veterans Affairs, 1989; Silver, 1989).

The modest-to-poor outcomes of these programs were increasingly evident first as clinical descriptions (Arnold, 1985; Walker and Cavenar, 1982), then informal empirical studies (Hammarberg and Silver, 1994; Perconte, 1989; Scurfield et al., 1990), and then more rigorous empirical work (Fontana and Rosenheck, 1996; Fontana and Rosenheck, 1997; Ford et al., 1997; Johnson et al., 1996; Johnson et al., 1999; Zlotnick et al., 1999) documented the tenacious stability in symptomatology among these veterans. Though some gains were noted at discharge from these programs, by 18-month follow-up nearly all of these gains had disappeared and in some cases symptoms had increased over admission values. Only levels of violence, substance abuse, and legal problems showed improvement.

These results are consistent with a study of a similar intensive treatment program for Israeli veterans, which showed no improvement in symptomatology at 9-month follow-up (Solomon, 1992). More positive results were found with Australian veterans, who in one study showed improvements across a number of areas of functioning (Creamer et al., 1999). There is evidence, however, that these veterans were higher functioning than those in the United States, with significantly higher marital status, lower combat exposure, and less severe symptomatology.

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Explanations for these results include regression to the mean due to selection bias at admission, negative impact of direct exploration of traumatic material, increased dependency due to inpatient treatment, secondary gain related to need to maintain service-connected disability status, and the imperviousness of chronic combat-related PTSD to treatment of any kind (Johnson, 1997; Rogers, 1998). Certainly the fact that treatment began many years after the war and that serious comorbid conditions (such as substance abuse, depressive illness, poverty) had developed should temper expectations of any treatment regimen.

Long-Term Course

The absence of significant treatment effects, however, only makes the question of what the long-term course of the illness is more important. One retrospective study (Bremner et al., 1996) suggests gradual improvement has occurred in this population in substance abuse, raising the possibility that over time these veterans' symptoms may partially abate. However, another study of 111 veterans who had sought clinical evaluation for PTSD 4 to 8 years earlier (Erwin et al., 1996) found that of the 88 veterans located, 14 were confirmed as deceased (16%). Rank at separation, PTSD symptoms, and vocational adjustment were associated with mortality, while combat exposure, and postmilitary medical symptoms were not associated with mortality. Other studies of mortality and/or suicide among Vietnam veterans have identified combat exposure (Farberow et al., 1990); postmilitary medical symptoms (Breslin et al., 1988; Kogan and Clapp, 1985); psychological symptoms, primarily PTSD symptoms (Bullman and Kang, 1994; Farberow et al., 1990, Hendin and Haas, 1991; Kramer et al., 1994); and postmilitary income and employment (O'Toole and Cantor, 1995) as significant factors.

Study Aims

Though the overall chronicity of PTSD among these veterans may have been well established, there remains conflicting information whether the long-term course of their illness is of slow improvement or deterioration. Detailed longitudinal studies are therefore of value to determine the ongoing clinical condition and overall health status of this population. The present study was conducted to contribute data regarding this question, given the opportunity to follow up on a cohort that had been intensively studied 6 years earlier (Johnson et al., 1996). The absence of a control group prevents testing treatment-specific effects, but because these were so modest at 18 months, this question is not central to the present investigation.

METHODS

Setting

The treatment program was a multidisciplinary, specialized inpatient treatment program for Vietnam veterans. Veterans were admitted in cohorts of 14 every 4 months for a 15-week program. Rigorous screening procedures were employed before admission to identify veterans with PTSD, based on DSM-III-R criteria, through clinical interviews and review of medical records. Combat experience was confirmed by review of their military files. Generally, veterans were required to have achieved a degree of stability in both their symptoms (*e.g.*, no suicidal ideation for 60 days, sobriety for 90 days); social functioning (*e.g.*, established living arrangement, family involvement in program); and previous outpatient treatment. Because the program was oversubscribed, veterans waited 4 months on average before being admitted. Written informed consent was obtained from each patient after all the procedures were fully explained. All procedures were approved by the hospital human investigation committee.

The treatment program consisted of an intense, multidimensional experience that provided psychoeducation, psychotherapy, and rehabilitation to the veteran and his family. The design of the program was essentially consistent with other specialized inpatient PTSD units within the Department of Veterans Affairs (DVA, 1989). Expressive, cognitive, exposure, family, and social interventions were integrated in a highly structured, 32-hours-per-week program. The unit was well staffed and stable during the treatment period of this study. Descriptions of the treatment program have been published elsewhere (Johnson et al., 1996; Johnson et al., 1994).

Subjects

Subjects included male Vietnam war-zone veterans diagnosed with PTSD (determined by a cutoff score of 107 on the Mississippi PTSD Scale; Keane et al., 1988) who were consecutive admissions to the specialized inpatient unit over the course of 6 cohorts, from September 1989–September 1991. A total of 74 veterans were admitted during this time. Ten dropped out or were expelled from the program. Thirteen veterans did not complete the follow-up evaluations. Therefore, a total of 51 veterans formed the subject pool for the original analysis. Of these, 86% were Caucasian, 39% were married, 27% were employed, 41% were disabled, and 57% had served in the Army. Their mean age was 42.7 years (SD = 2.3), and educational level was 12.9 years (SD = 2.3). Detailed demographic data on the sample was included in the previous report (Johnson et al., 1996).

Follow-up Procedures

An attempt was made to contact all 74 veterans who had originally entered the program 6 years earlier. Contact was made by phone or letter, using their last known address. Approximately a third of the subjects were being seen as outpatients at the West Haven Medical Center. Informed consent was obtained from each veteran or family member interviewed after the study procedures were completely de-

scribed. Once consent was given, research assistants not connected with the treatment program administered the study measures, in person whenever possible, and if not, then in a phone interview. Questionnaires ($n = 25$) were mailed to the subjects who could not come to the medical center. In the case where a veteran had died, family members were interviewed to confirm the cause of death. Assessments were conducted between July 1995 and January 1997. Information was collected on 66 of the 74 entrants, including 47 of the 51 completers.

Measures

The War Stress Interview-Follow-up Version (WSI) is a 1-hour structured clinical interview consisting of a battery of established scales relevant to the study of PTSD and combat-related trauma (Fontana et al., 1993). Among the standard interviews and scales incorporated into the War Stress Interview are the Mississippi Scale for PTSD (Keane et al., 1988), the Revised Addiction Severity Index (McLellan et al., 1985), the Brief Symptom Inventory (Derogatis and Melisaratos, 1983), and measures of violent behavior and ideation (Kulka et al., 1990), contact with intimates, and participation in social activities (Katz and Lyerly, 1963). Three subjects did not complete the WSI.

The Clinician Administered PTSD Scale (CAPS) had been administered to many of the original subjects, and was again administered by the research assistants (Blake et al., 1990). An insufficient number (about half) of the CAPS at 18-month follow-up were available, so only admission and 6-year follow-up data were used. Three subjects did not complete the CAPS.

The Combat Exposure Scale (CES) was administered at admission (Keane, et al., 1989) and demonstrated high levels of exposure to combat (mean = 31.10, SD = 4.56).

Stressful Life Events

Veterans were asked at follow-up whether they had experienced any of 11 categories of stressful life events in the past 6 years and, if so, with what frequency. These events included change of residence, change of employment, marriage, divorce, birth of children, death of significant other, arrest, imprisonment, inpatient hospitalization, suicide attempt, and medical emergency.

Veterans' Ratings of Functioning

In addition, veterans were asked at follow-up to rate 10 dimensions of functioning on a scale from 0 (very negative) to 10 (very positive) at three different time periods: the year before admission, the year immediately after discharge, and the past year. The 10 dimensions included feelings about yourself, physical health, spiritual life, PTSD symptoms, substance abuse, family life, friendships, social and leisure activities, employment, and overall life satisfaction. It was understood that these were retrospective ratings and that at best they might measure the veterans' general perceptions of the course of their illness and functioning.

Program Impact

Veterans were then asked to rate the degree to which the treatment program had impacted on these 10 dimensions on a scale from 0 (very negative impact) to 5 (no impact) to 10 (very positive impact). Finally, four general questions were asked about the overall beneficial effect of the program on their life.

Data Analysis

The analytic strategy consisted of assessing differences at admission 18 months after discharge and at 6 years after discharge for surviving treatment completers ($n = 39$). Repeated measures ANOVAs were used on the Veterans' Ratings of Functioning. Random regression modeling was used for the War Stress Interview data due to missing data at various time points. The random regression approach uses the available data from each individual, augmented by data from all other individuals, to estimate the trend line across all time points for each individual. In this way, the maximum amount of information in the data set is used in the analyses, avoiding distortion due to selective dropping of cases or time points. We have adopted an approach developed for modeling missing data for repeated measures utilizing structured covariance matrices (Jennrich and Schluchter, 1986). Differences between deceased versus live veterans were analyzed by t-tests of admission data, followed by logistic regression using all significant factors, on the original sample of 74 entrants to the program. Significance levels for each analysis were corrected for multiple comparisons by the Bonferroni method.

RESULTS

Mortality

Of the 74 original entrants to the program, 8 could not be found and 11 had died (17%). Similarly, of the 51 subjects included in our previous study, 4 could not be found, leaving a possible 47 subjects for this study. Of these, 8 had died (17%). This figure is consistent with the 16% mortality rate found by the other mortality study (Erwin et al., 1996). Combining the data from these two studies, 25 of 154 veterans located had died within 6 years of seeking treatment. This mortality rate (2.8% per annum) is nearly 5 times higher than the expected rate among American men in this age range (ages 45–54) (US Bureau of Census, 1997), though presumably the mortality rate among veterans with substance abuse only or Vietnam veterans without PTSD would provide better comparison. In fact, this result compares well to the standardized mortality ratio of 3.97 found by Bullman and Kang (1994) in their sample of 4,247 Vietnam veterans with PTSD.

Causes of death in our sample included drug overdose (2); motor vehicle accidents (3); suicide (3); medical causes (1 each of stroke, heart failure, liver disease), a pattern similar to that found by the other study (Erwin et al., 1996).

Within the present sample, comparisons by *t*-tests of deceased versus live veterans on their admission measures showed significant differences on four items: deceased veterans had more convictions before admission ($t = 3.57$, $df = 44$, $p < 0.001$); more medical problems in 30 days before admission ($t = 2.52$, $df = 45$, $p < 0.05$); greater need for help with drug abuse ($t = 2.03$, $df = 44$, $p < 0.05$); and fewer employers since discharge from the military, ($t = 1.92$, $df = 44$, $p < 0.05$). Notably, combat exposure and level of severity of PTSD symptoms on the CAPS did not differentiate living versus deceased subjects. In a logistic regression analysis with mortality as the dependent variable, need for help with drug abuse dropped out, leaving the following three variables and odds ratios: number of convictions (1.77, $X^2 = 9.93$, $df = 1$, $p < 0.01$); number of medical problems (2.05, $X^2 = 3.86$, $df = 1$, $p < 0.05$); number of employers since discharge (.91, $X^2 = 4.41$, $df = 1$, $p < 0.05$) as significantly associated with death of the veteran. Concordance of the resulting model was 92.9%

The remaining analyses were conducted on the sample ($n = 47$) of located treatment completers.

Stressful Events

Table 1 lists the frequency of stressful events experienced by the study group over the 6 years. Of note is that change of residence and inpatient hospitalization occurred for nearly three-fourths of the sample, followed by death of significant other and medical emergency for about half. No subject had a child during this period. A subject's total number of stressful events was not associated with their CAPS scores at 6 years ($r = .05$, $df = 36$) nor were any individual items correlated with CAPS.

TABLE 1. Frequencies of Stressful Events since Discharge ($N = 39$)

Event	*N*	Percent	Range
Change of Residence	31	79	0–13
Inpatient Hospitalization	29	74	0–26
Death of Significant Other	18	46	0–12
Medical Emergency	16	41	0–4
Divorce	11	28	0–1
Marriage	10	26	0–1
Suicide Attempt	8	21	0–10
Arrest	8	21	0–7
Change of Employment	7	18	0–3
Imprisonment	5	13	0–2
Birth of Children	0	0	0

CAPS

Table 2 lists the *t*-tests of the CAPS scores from Admission to 6-year follow-up. There were no significant changes in Reexperiencing, Avoidance, or Total scores but a significant increase in Hyperarousal symptoms.

War Stress Interview

Table 3 lists the results of random regression analyses (without covariates) of the WSI at admission, 18-months follow-up, and 6-year follow-up. Symptoms on the Mississippi, BSI, and ASI Psychiatric, Alcohol, and Drugs showed no significant changes over the study period. Violence showed significant improvement. Days worked, visits with people close to them, and social participation showed no change, but the number of people close to the veteran dropped significantly, from around 10 at admission to 6.59 at 6-year follow-up.

Veterans' Ratings of Functioning and Program Impact

Table 4 lists the repeated measures ANOVAs on veterans' ratings of level of functioning across 10 dimensions from the year before admission, year after admission, and in the past year. In all dimensions except employment, the veterans reported significant improvement at each time point. Total Functioning was moderately correlated with their 6-year CAPS scores, particularly Past Year Functioning: ($df = 39$: Year Prior, $r = .36$, $p < 0.05$; Year Post, $r = .31$, $p < 0.05$; Past Year, $r = .54$, $p < 0.01$).

The veterans also rated the impact of the program on these dimensions, and in general they rated the program as having had a mild positive impact (range 5.18–6.43 on a 1—10 scale). Interestingly, PTSD symptoms were ranked high in terms of improvement but low in terms of program

TABLE 2. Comparison of CAPS Scores and Standard Deviations at Admission and Six-Year Follow-up ($N = 36$)

Measure/(SD)	Admission	Follow-up	t(35)
Re-experiencing	2.29	2.27	.11
SD	(.87)	(.86)	
Avoidance	1.89	1.91	−.18
SD	(.71)	(.85)	
Hyperarousal	2.31	2.69	−3.31*
SD	(.62)	(.55)	
Total CAPS	2.16	2.29	−1.38
SD	(.59)	(.60)	

*$p < .01$

TABLE 3. Random Regression of Outcome Measures Over Time (N = 36)

Measure/(SD)	Admission	18 months	6 Years	$\chi^{2(1)}$
Mississippi	129.71	135.33	131.17	3.66
SD	(17.23)	(18.84)	(23.54)	
BSI	2.21	2.49	2.39	4.29
SD	(.74)	(.70)	(.83)	
ASI Psychiatric	.65	.64	.57	3.13
SD	(.14)	(.18)	(.18)	
ASI Alcohol	.17	.18	.07	5.04
SD	(.23)	(.20)	(.12)	
ASI Drugs	.09	.08	.03	3.72
SD	(.13)	(.12)	(.08)	
Violence	13.98	10.15	5.93	12.19**
SD	(5.96)	(5.90)	(5.38)	
Days Worked	3.44	3.78	1.22	1.20
SD	(7.11)	(8.27)	(4.99)	
Number People Close	10.07	12.88	6.59	6.92*
SD	(8.05)	(9.64)	(6.10)	
See People Close	396.89	450.88	498.27	.43
SD	(254.98)	(285.53)	(286.56)	
Social Participation	10.61	11.12	9.59	3.81
SD	(4.96)	(5.03)	(3.75)	

*$p < .05$, **$p < .01$

TABLE 4. Repeated Measures ANOVAs on Veterans' Ratings of Functioning and Program Impact in Ten Domains at Three Time-Points (N = 39)

Measure/(SD)	Yr Prior	Yr Post	Past Yr	F(2,76)	Impact
Substance Abuse	4.63	6.89	8.50	17.44***	6.34
SD	(4.56)	(3.58)	(2.19)		(2.43)
Overall Life Satisfaction	1.14	3.05	4.40	16.96***	5.89
SD	(2.54)	(2.89)	(2.61)		(3.18)
PTSD Sx	1.50	3.58	4.34	14.28***	5.18
	(2.54)	(2.89)	(2.61)		(3.18)
Feelings about self	1.74	3.50	4.47	10.73***	5.82
SD	(2.33)	(2.83)	(3.01)		(2.71)
Family Life	1.89	4.35	4.27	9.43***	5.86
SD	(2.85)	(2.62)	(2.80)		(2.77)
Spiritual Life	2.08	3.08	4.00	7.56***	5.63
SD	(2.70)	(3.42)	(3.65)		(1.26)
Social/Leisure	2.27	3.78	3.89	5.95**	5.59
SD	(3.07)	(3.03)	(3.10)		(.98)
Friendships	2.68	3.68	4.14	4.65*	6.03
SD	(3.21)	(3.28)	(3.35)		(2.19)
Physical Health	4.55	5.87	5.50	3.62*	5.37
SD	(3.18)	(2.37)	(2.76)		(1.75)
Employment	1.40	1.08	1.24	.41	5.30
SD	(3.00)	(2.58)	(2.88)		(.94)

*$p < .05$, **$p < .01$, ***$p < .001$

impact, and friendships were ranked low in terms of improvement but high in terms of program impact. Total Impact was significantly correlated with year after functioning (r = .62, df =39, $p < 0.01$), moderately correlated with past year functioning (r = .43, df = 39, $p < 0.05$), and not correlated with prior year functioning (r = .09) as was expected.

On the question of overall program benefit, 14 subjects (36%) rated the program as having been very beneficial to them, 17 (44%) as mildly beneficial, none as having no impact, 4 (10%) as mildly harmful, and 4 (10%) as very harmful.

DISCUSSION

The limitations of this study include a small, highly selective sample size and lack of a comparison group, which prevent generalization of the results to the larger population of veterans with PTSD. Nevertheless, these data present a somber picture of the tenacity and lethality of combat-related posttraumatic stress disorder in this sample. That 17% of the participants in this treatment-seeking sample are now deceased, all by their late forties, gives rise to concern. Indeed, most of the causes of death appear to be associated with either self-destructive or high-risk behavior. Additionally, if outcome data for symptoms and social functioning on the deceased veterans had been available for inclusion in this study, the results for the entire sample would presumably be worse than those reported here. Supported by similar results from another study (Erwin et al., 1996), these results suggest that the need to provide ongoing support for these veterans, as well as to search for effective treatment methods, should be of paramount interest to those invested with their care.

It is important to emphasize that the mortality rate of middle-aged men with other disorders (*e.g.*, substance abuse, schizophrenia, depression) was not obtained and may be similar to that found in this sample. However, even if not unique, the specific causes of death are important subjects of research inquiry. In this study, the two best predictors of death, prior convictions and medical problems, are certainly understandable precursors to mortality. However, these were not associated factors in the previous study (Erwin et al., 1996), which found psychiatric symptoms, rank at discharge, and vocational adjustment to be significant. These discrepancies suggest caution in identifying any specific variables as predictors. Interestingly, potentially important factors such as combat exposure, severity of PTSD symptoms, and substance abuse were not significant predictors of death, suggesting that mortality may be due to other comorbidities. It is possible,

however, that this result is due to a ceiling effect, for men in this sample had extremely high values on these variables.

Symptomatic expression of the disorder appears to have increased over time, especially in hyperarousal symptoms. It is not clear what explains this. Increased anxiety symptoms may be the result of lowered alcohol and substance use. Maladaptive coping behaviors such as violence and substance abuse appear to have been consistently decreasing, which is a very positive result. However, in examining the longitudinal data collected by another study (Bremner et al., 1996), it appears that alcohol abuse had already been consistently decreasing for over 10 years before treatment, suggesting that the continued decrease after treatment is largely an aging effect, not a treatment effect. That 74% had had another inpatient hospitalization and 92% had been in outpatient treatment, suggests that these veterans had availed themselves of support of mental health professionals. However, it appears that the veterans were more insulated, spending time with fewer people. Nearly three-quarters remained unemployed (the sample as a whole had worked on average 1 day in the past month).

In contrast, the veterans' global self-ratings of functioning were consistently positive, indicating steady gains in all areas except employment and physical health. Of interest is that they reported experiencing significant improvement on PTSD symptoms, despite reporting no change or increases in symptoms on the standardized measures. This may be an indication of having coped with their illness more effectively, leading to less distress over these chronic symptoms. If so, then these data suggests that despite the fact that this population may appear to have "calmed down" and be coping with their illness more effectively than before, they nevertheless are still experiencing high levels of symptomatology. Veterans' global self-reports, therefore, may not be the best indicators of actual symptomatic expression. These data are consistent with many other studies that show significant discrepancies between subjective and objective measures of outcome, highlighting the need for studies to use both types of assessment.

The veterans on the whole remained positive about their experience with the inpatient program 6 years before. They felt that the program had had the most impact on substance abuse, self-esteem, friendships, and family relationships, and least on PTSD symptoms, employment, and physical health. This is consistent with previous data that indicate the morale and relationship dimensions were the most responsive to treatment (Johnson et al., 1996; Johnson and Lubin, 1997).

In summary, the results of this study support the view that combat-related PTSD, as experienced in the United States by treatment-seeking Vietnam veterans, is a severe and chronic condition, with substantial lethality. A quarter of a century after their combat experiences, the primary symptoms of their disorder remain at high levels despite ongoing outpatient and inpatient care. On a more positive note, these veterans report gradually declining levels of violence and substance abuse and significant increases in their overall life satisfaction, as well as appreciation for the efforts to treat their illness.

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REFERENCES

Arnold A (1985) Inpatient treatment of Vietnam Veterans with post-traumatic stress disorder. In S Sonnenberg, A Blank, J Talbot (Eds), *The Trauma of War: Stress and Recovery in Vietnam Veterans*. Washington, DC: American Psychiatric Press.

Blake DD, Weathers FW, Nagy LM, Kaloupek D, Klauminzer G, Charney D, Keane T (1990) A clinician rating scale for assessing current and lifetime PTSD: the CAPS-1. *Behav Ther*. 13:187–188.

Bremner JD, Southwick SM, Darnell A, Charney DS (1996) Chronic PTSD in Vietnam combat veterans: course of illness and substance abuse. *Am J Psychiatry*. 153:369–375.

Breslin P, Kang HK, Lee Y, Burt V, Shepard BM (1988) Proportionate mortality study of U.S. army and U.S. marine corps veterans of the Vietnam war. *J Occup Med*. 30:412–419.

Bullman TA, Kang HK (1994) Posttraumatic stress disorder and the risk of traumatic deaths among Vietnam veterans. *J Nerv Ment Dis*. 182:604–610.

Creamer M, Morris P, Biddle D, Elliott P (1999) Treatment outcome in Australian veterans with combat-related PTSD: a cause for cautious optimism? *J Traum Stress*. 12:545–558.

Department of Veterans Affairs (1989) *Guidelines for Specialized Inpatient PTSD Programs*. Washington, DC: Department of Veterans Affairs.

Derogatis LR, Melisaratos N (1983) The brief symptom inventory: an introductory report. *Psychol Med*. 13:595–605.

Erwin B, Niles BL, Newman E, Fisher L, Kaloupek DG, Keane TM (1996) *Psychopathological Predictors of Mortality in Trauma Exposed Vietnam Veterans*. Presented at Twelfth annual meeting of the International Society of Traumatic Stress Studies, San Francisco, California.

Farberow NL, Kang HK, Bullman TA (1990) Combat experience and postservice psychosocial status as predictors of suicide in Vietnam veterans. *J Nerv Ment Dis*. 178:32–37.

Fontana A, Rosenheck R (1996) Improving the efficiency of resource utilization in outpatient treatment of post-traumatic stress disorder. *Admin Policy Ment Health*. 23:197–210.

Fontana A, Rosenheck R (1997) Effectiveness and cost of inpatient treatment for PTSD. *Am J Psychiatry*. 154:758–765.

Fontana A, Rosenheck R, Spencer H (1993) *The Long Journey Home III: Third Progress Report on the Department of Veterans Affairs Specialized PTSD Programs*. West Haven, CT: Department of Veterans Affairs.

Ford JD, Fisher P, Larson L (1997) Object relations as predictors of treatment outcome with chronic PTSD. *J Consult Clin Psychol*. 64:547–559.

Hammarberg M, Silver S (1994) Outcome of treatment for post-traumatic stress disorder in a primary care unit serving Vietnam veterans. *J Traum Stress*. 7:195–216.

Hendin H, Haas AP (1991) Suicide and guilt as manifestations of PTSD in Vietnam combat veterans. *Am J Psychiatry*. 148:586–591.

Jennrich RI, Schluchter MD (1986) Unbalanced repeated-measures models with structured covariance matrices. *Biometrics*. 42:805–820.

Johnson D (1997) Inside the specialized inpatient PTSD units of the Department of Veterans Affairs. *J Traum Stress*. 10:357–360.

Johnson D, Feldman S, Southwick S, Charney D (1994) The concept of the second generation program in the treatment of PTSD among Vietnam veterans. *J Traum Stress*. 7:217–236.

Johnson D, Lubin H (1997) Treatment preferences of Vietnam veterans with PTSD. *J Traum Stress*. 10:391–406.

Johnson D, Lubin H, Rosenheck R, Fontana A, Southwick S, Charney D (1999) Comparison of outcome between homogeneous and heterogeneous treatment environments in combat-related PTSD. *J Nerv Ment Dis*. 187: 88–95.

Johnson D, Rosenheck R, Fontana A, Lubin H, Southwick S, Charney D (1996) Outcome of intensive inpatient for combat-related PTSD. *Am J Psychiatry*. 153:771–777.

Katz MM, Lyerly SB (1963) Methods for measuring adjustment and social behavior in the community: rationale, description, discriminative validity and scale development. *Psychol Reports*. 13:505–535.

Keane TM, Caddell JM, Taylor KL (1988) The Mississippi Scale for Combat related PTSD: studies in reliability and validity. *J Consult Clin Psychol*. 56:85–90.

Keane TM, Fairbank JA, Caddell JM, Zimering RT, Taylor KL, Mora CA (1989) Clinical evaluation of a measure to assess combat exposure. *Psychol Assessment*. 1:53–55.

Kluznik JC, Speed N, VanValkenburg C, Magraw R (1986) Forty year follow-up of United States prisoners of war. *Am J Psychiatry*. 143:1443–1446.

Kogan MD, Clapp RW (1985) *Mortality Among Vietnam Veterans in Massachusetts, 1972–1983*. Boston, Massachusetts Office of Commissioner of Veterans Services: Agent Orange Program.

Kramer TL, Lindy JD, Green BL, Grace MC, Leonard AC (1994) The comorbidity of PTSD and suicidality in Vietnam veterans. *Suicide and Life Threatening Behavior*. 24:58–67.

Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS (1990) *Trauma and the Vietnam War Generation: Report of Findings from the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel.

McLellan AT, Luborsky L, Cacciola J, Griffith J, Evans F, Barr HL, O'Brien CP (1985) New data from the Addiction Severity Index: reliability and validity in three centers. *J Nerv Ment Dis*. 173:412–423.

O'Toole BI, Cantor C (1995) Suicide risk factors among Australian Vietnam era draftees. *Suicide and Life Threatening Behavior*. 25:475–488.

Perconte S (1989) Stability of positive treatment outcome and symptom relapse in posttraumatic stress disorder. *J Traum Stress*. 2:127–136.

Rogers S (1998) An alternative interpretation of intensive PTSD treatment failures. *J Traum Stress*. 11:769–776.

Scurfield R, Kenderdine S, Pollard R (1990) Inpatient treatment for war-related posttraumatic stress disorder: initial findings on a longer-term outcome study. *J Traum Stress*. 3:185–202.

Silver S (1989) An inpatient program for PTSD: context as treatment. In C Figley (Ed), *Trauma and its Wake. Vol. 2*. New York: Brunner/Mazel.

Solomon Z (1992) The Koach Project. *J Traum Stress*. 5:173–272.

Speed N, Engdahl B, Schwartz J, Eberly R (1989) PTSD as a consequence of the POW experience. *J Nerv Ment Dis*. 177:147–153.

U.S. Bureau of the Census (1997) *Statistical Abstracts of the United States, 117th Edition*. Washington, DC: US Government.

Walker J, Cavenar J (1982) Vietnam veterans: their problems continue. *J Nerv Ment Dis*. 170:174–179.

Zlotnick C, Warshaw M, Shea T, Allsworth J, Pearlstein T, Keller M (1999) Chronicity in PTSD and predictors of course of comorbid PTSD in patients with anxiety disorders. *J Traum Stress*. 12:89–100.